Longer term predictions of water resources

Many decisions about future investment in development and infrastructure require information on what climate will be like in the next 10–20 years. This is most useful when considered alongside other factors such as population growth and technology changes. The Met Office Hadley Centre has pioneered a new system (known as DePreSys) to predict better the climate a decade ahead. Decadal models forecast natural climate variations, such as El Niño and fluctuations in the Gulf Stream, in addition to man-made climate change. Our technique has already been demonstrated to improve global-mean temperature predictions. Climate forecasts on a regional basis are currently being assessed.

Such decadal forecasts are beginning to offer predictions of more direct, practical relevance to organisations where adaptation to global warming is a key operational concern. In particular, they could prove strategically important for better development and infrastructure planning in many parts of the world. In particular, our techniques will allow adaptation measures to be more precisely targeted to regions and times when they are most needed — saving lives and reducing costs.

The forecasts can also help public and private sector decision makers to understand the threat from climate change, by understanding its more immediate impacts on timescales that they will have to deal with in their working lifetime.

PRECIPITATION CHANGES BY THE 2030s

Decadal climate variability and climate change affect a number of key sectors such as public health and energy industries. In particular, changes in temperature and rainfall affect the prevalence and spread of certain diseases and both demand and supply of electricity.

DFID[1] and WHO[2] have commissioned the Met Office Hadley Centre to provide predictions of global changes in rainfall by the 2030s. The predictions are being used to assess the likely impact of climate change on the viability of current and planned technologies to provide water supply and sanitation consistent with targets set by the Millennium Development Goals. The final DFID/WHO report will assess the cost effectiveness and robustness of the technologies. It will be used to identify key research needs in terms of regions and technologies and to identify and promote technologies that are most appropriate in different regions.

BANGLADESH IN THE 2020s AND 2050s

While the southern part of Bangladesh suffers from frequent flooding due to storm surges, parts of the Ganges-Brahmaputra-Meghna Basin are likely to face increased water stress in the 2020s. The Met Office Hadley Centre, in collaboration with the CEH[3], produced water-stress assessments for Bangladesh[4].

Our results and their implications were discussed with stakeholders in Bangladesh in a workshop in Spring 2008 and will support improved decision making. We are currently adding new capability to include the impact of melting mountain glaciers on future water resource assessments. Changes in the timing and amount of glacier melt might affect up to one sixth of the world's population and be especially important in regions such as Bangladesh where the capacity to adapt is limited.

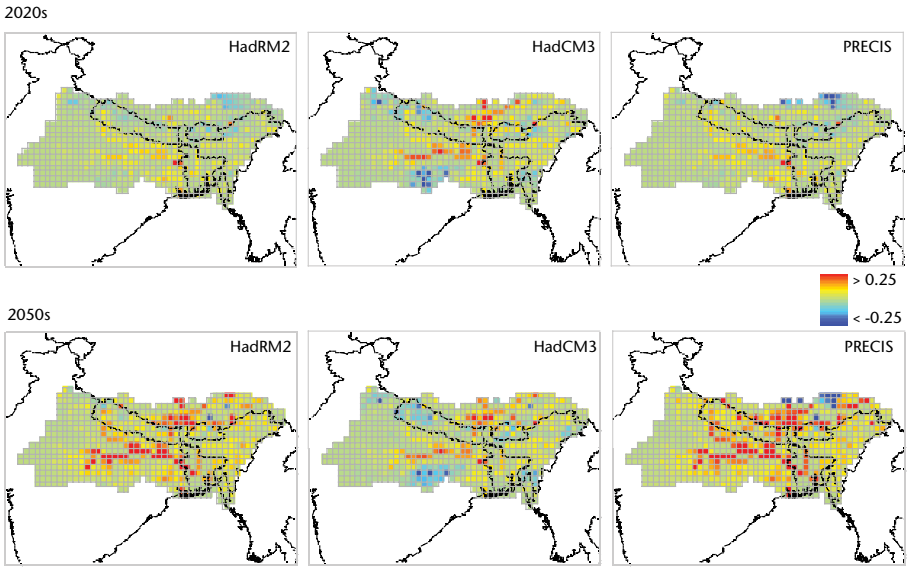

Figure: Changes in water availability index[5] relative to present day, driven by three different Met Office Hadley Centre Climate models for 2020s and 2050s using a business as usual IPCC scenario. Positive values show increase in water stress. The different models give an estimate of the expected uncertainty.

[1] UK Department for International Development

[2] World Health Organization

[3] Centre for Ecology & Hydrology

[4] F. Farquharson et al., 2007: Impact of climate and sea level change in part of the Indian sub-continent, CLASIC Final Report to Department for International Development, United Kingdom, KAR Project R8038, 125pp.

[5] Derived from the CEH Global Water Availability Assessment (GWAVA) model

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